For instance, on p. 454 the notion that 'the close agreement between the effect upon the functional changes (in nerve) of external CO_2, and of previous nerve activity, is an indication that CO_2 is produced during the active state,' is mentioned without any warning to the innocent student that this is a mere airy speculation, such stuff, in fact, as only dreams and Croonian lectures are made of. By the way, it seems rather a pity that in a book of this size the use of such inaccurate contractions as CO_2 for carbon dioxide should have been countenanced for the sake of a petty saving of space.

On p. 499, in the account given of the changes of conductivity produced in a nerve by the passage of electrical currents it is stated that the block is established during closure at the anode and after opening at the cathode. No mention is made of the well-known experiments of Hermann and others which demonstrate that the block at the cathode during closure of a voltaic current is relatively greater than at the anode, while after opening, this relation is reversed.

On 48, the statement is made that in Stolnikow's determination of the output of the heart on the 'simplified circulation,' the output was probably maximal on account of the low resistance to the outflow. It ought not to be left to the student to supply the criticism that the heart can not have been normally fed through the coronary arteries with a pressure of only 30 or 40 mm. of mercury in the aorta, and therefore probably was not beating with normal strength. On the same page a comparison of Zuntz's results on the output in the horse, obtained by a method theoretically perfect, with those of Tigerstedt in the rabbit, obtained by a method of dubious propriety, is concluded by the remark that when the output per second is expressed as a fraction of the body-weight the results of the two observers roughly agree. The reader would inevitably draw from this passage the inference that the accuracy of Tigerstedt's numbers is supported by this agreement. The exact opposite is the case. For it is well established that the output of the heart is much greater in proportion to the body-weight in small animals than in large. If, then, Zuntz's results are right for the horse, Tigerstedt's can not be right for the rabbit.

We are glad to see that Dr. Gaskell in his article on the contraction of the cardiac muscle, written in the interesting and almost autobiographical style so characteristic of this author when he handles this theme, has at last rid himself of the picturesque hypothesis that the positive electrical variation, observed by him in the quiescent auricle of the tortoise on stimulation of the vagus, indicates 'anabolic' changes in the muscular fibers, while the negative variation seen on stimulation of the augmentor nerves of the quiescent ventricle of the frog or toad indicates 'katabolic' changes, and has adopted the more prosaic view of other writers, that the electrical changes are simply associated with alterations in the tone of the heart muscle too small to be easily seen.

The contributors to this and the previous volume include most of the prominent workers in English physiology; and nearly all write upon subjects the knowledge of which they have advanced by their own labors. Thus, Dr. Leonard Hill, in one of the best articles in the book, treats of the circulation; Sir J. Burdon Sanderson, of striped muscle, including the electrical phenomena of this tissue, in the investigation of which he stands facile princeps in the English-speaking world; Professor Gotch, of nerve and electrical organ; Professors Schäfer and Sherrington, of the central nervous system; Dr. Langley, of the sympathetic and allied systems; Professor Haycraft, of animal mechanics, taste and smell; Professor McKendrick and Dr. Gray, of the ear and voice; Professor Starling, of the muscular and nervous mechanisms of the digestive tract, etc.; and Dr. Rivers, of vision.

G. N. I. S.

Die Lehre vom Skelet des Menschen, unter besonderer Berüchsichtigung entwickelungsgeschichtlicher und vergleichend-anatomischer Gesichtspunkte und der Erfordernisse des Anthropologischen Unterichtes an höheren Lehranstalten, bearbeitet. Von DR. F. FRENKEL, Professor am Königl. Gymnasium zu Göttingen. Mit 81 Textfiguren. Jena, Gustav Fischer. 1900.

We have given the title at length, cumbersome as it is, because it expresses the nature of the work, and because this book has the merit of being what it pretends to be. More than that, it is the successful working out of a well-considered and philosophical plan. The purpose, in short, is to offer to students a guide to the general principles governing the morphology of the human skeleton, considered according to development and comparative anatomy. The great beauty of the book is the subordination of details to principles. It does not teach the bones as they must be taught to a student of medicine, but we wish that all medical students could have been put through this book before the beginning of their medical studies.

With the bones are very properly considered both cartilages and ligaments. It is not the disjointed skeleton that is before us, but the real framework of the body. There is first a short chapter on the histology of bone and the other connective tissues involved, and then we begin the development of the skeleton from the *chorda dorsalis*. Then we have the shapes of bones, their connections, the development of joints and the various kinds. Then we come to the description of the particular parts of the skeleton with the scientific significance dwelt upon and the details suppressed. What a relief from the compendium of anatomy which thinks well of itself because it gives the several surfaces of the orbital process of the palate bone! On the other hand, to take one example of many, how interesting to have the comparative anatomy of the malar bone!

It is not necessary to discuss the book in further detail. There are many morphological questions concerning which different opinions may be held, and an author is not necessarily wrong even if the reviewer should not agree with him on all points. That the plan of the book is good and that the aim of the author has been true is praise enough. We will add, that we wish someone would 'do it into English.'

THOMAS DWIGHT.

HARVARD MEDICAL SCHOOL.

Evolution of the Thermometer, 1592–1743. By HENRY CARRINGTON BOLTON. Easton, Pa., The Chemical Publishing Co. 1900. 98 pp.

This neatly printed and tastefully bound little monograph will be of interest to all physicists and chemists, and to the general public as well, for it deals with one of the most indispensable instruments in every laboratory, and one which, almost alone of those used by scientific men, has become an instrument of interest and use in every household.

In dispelling the fallacies and clearing away the obscurities which have enveloped the evolution of the thermometer, Dr. Bolton has again placed scientific men under an obligation, while at the same time he has afforded them an hour's entertaining reading.

The book opens by disposing of the oft-repeated claims that the inventor of the thermometer was Drebbel. The first use of the name, thermometer, and the first accurate description, comes from Leurechon in 1624, but the real inventor of the instrument was Galileo, and the date between 1592 and 1597. This is proved, not from any statements of the inventor, but from letters written to him, and the proof is complete. This first thermometer consisted of a bulbed tube, inverted in colored water, in which the liquid rose and fell with the temperature of the bulb. With such an instrument Sanctorius discovered that there was a normal body temperature. In 1632 Jean Rey made a water thermometer, in which the expansion of a fluid replaced that of air, and not long after this Ferdinand II. of Tuscany, by sealing the top of the tube, gave approximately the modern form to the instrument. Mercury had been previously used to show expansion by heat, but in 1714 Fahrenheit constructed the first mercury thermometer with a reliable scale.

Many different scales have at various times been applied to the thermometer, and in most of them the graduation has been almost purely arbitrary. The origin of the Fahrenheit scale is involved in much obscurity. Réaumur was the first to use the melting point of ice for zero, while his boiling point of water, 80°, was obtained by the expansion of one thousand parts of 80 per cent. alcohol between the freezing and boiling points of water. As this was eighty parts, he used this number for his higher fixed temperature. The first to adopt 0° and